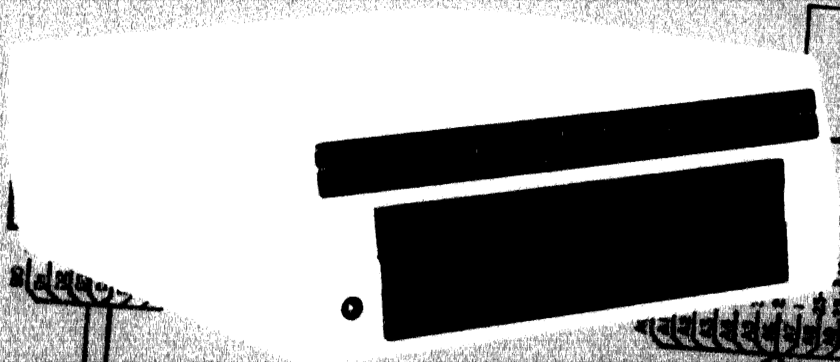
1541 Maintenance Guide



Michael G Peltier

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735 N. Doris
Wichita, Kansas 67212

Commodore Business Machines, Inc., and the author of this manual advise that any attempt to repair the VIC-1541 or the 1541 disk drives during the warranty period will void the factory warranty.

2/87

WARNING:

HIGH VOLTAGE EQUIPMENT

THIS EQUIPMENT CONTAINS CERTAIN CIRCUITS AND/OR COMPONENTS OF EXTREMELY HIGH VOLTAGE POTENTIALS, CAPABLE OF CAUSING SERIOUS BODILY INJURY OR DEATH. WHEN PERFORMING ANY OF THE PROCEDURES CONTAINED IN THIS MANUAL, HEED ALL APPLICABLE SAFETY PRECAUTIONS.

RESCUE OF SHOCK VICTIMS

1. DO NOT ATTEMPT TO PULL OR GRAB THE VICTIM
2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER.
3. IF YOU CANNOT TURN OFF ELECTRICAL POWER, PUSH, PULL OR LIFT THE VICTIM TO SAFETY USING A WOODEN POLE, A ROPE OR SOME OTHER DRY INSULATING MATERIAL.

FIRST AID

1. AS SOON AS VICTIM IS FREE OF CONTACT WITH SOURCE OF ELECTRICAL SHOCK, MOVE VICTIM A SHORT DISTANCE AWAY FROM SHOCK HAZARD.
2. SEND FOR DOCTOR AND/OR AMBULANCE.
3. KEEP VICTIM WARM, QUIET AND FLAT ON HIS/HER BACK.
4. IF BREATHING HAS STOPPED , ADMINISTER ARTIFICIAL RESUSCITATION. STOP ALL SERIOUS BLEEDING.

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SECTION 1
INTRODUCTION

Section 1-INTRODUCTION

1-1. General

The 1541 Maintenance Guide is produced to give a brief, concise source of pertinent information necessary for maintenance of the VIC-1541 and the 1541 disk drives. Most of the information in this Guide has come from the 1541 Maintenance Manual, which is also published by Peltier Industries. For those persons desiring more thorough coverage of the 1541 series of disk drives, the 1541 Maintenance Manual is available through authorized dealers.

1-2. VIC-1541 vs. 1541

The VIC-1541 (also known as the 1540) was the first generation of the 1541 disk drive. Basically, COMMODORE selected certain discrete components which were present on the VIC-1541 Disk Controller PC Board and combined them in custom IC's. When they did this, they renamed the disk drive the 1541 and changed the reference designators (schematic identification of parts). Functionally, there is very little difference between the two versions. Text in this Guide refers to the VIC-1541. Section 4 contains the 1541 Disk Controller Schematic and Disk Controller PC Board Parts Layout. For a complete discussion of the differences between the two versions, the 1541 Maintenance Manual may be consulted. For the purposes of this Guide, the following table and close inspection of the 1541 Disk Controller Schematic will enable 1541 owners to calibrate and troubleshoot their units. 1541 owners must cross-reference all test points before attempting any of the procedures in this Guide.

Jack/Plug Numbers

VIC-1541		1541
J1/P1	is	J1/P1
J2/P2	is	J8/P8
J3/P3	is	J2/P2
J4/P4	is	J3/P3
J5/P5	is	J5/P5
J6/P6	is	J6/P6
J7/P7	is	J7/P7
J8/P8	is	J4/P4
J9	is	J9

1-3. Warnings, Cautions and Notes

Throughout this Guide are a number of Warnings, Cautions and Notes. A Warning means that there is a possibility of serious injury, or even death, to the technician if the Warning is not heeded. A Caution means that there is a possibility of damage to the VIC-1541 if the Caution is not heeded. A Note is intended to serve as an aid to the technician in understanding text or in following a procedure.

SECTION 2
CALIBRATION

Section 2-CALIBRATION

2-1. **General**

This section contains step-by-step procedures for calibrating the VIC-1541. Only one calibration adjustment, to adjust the speed of the disk to 300 rpm, is provided in the VIC-1541. Perform the calibration procedure at the following intervals:

1. Every 6 months.

2. During the process of troubleshooting.

3. After a repair action.

2-2. **Equipment Required**

1. Small slotted screwdriver

2. Phillips screwdriver

3. Timing light (Refer to Appendix B)

NOTE

- Any strobe light with an accurate frequency of 50 Hz (+/- 1%) or 60 Hz (+/- 1%) may be used in place of the timing light.

4. Blank floppy disk (5 1/4 inch, single sided)

2-3. **Preparation for calibration** (Detailed disassembly/assembly instructions can be found in the 1541 Maintenance Manual.)

1. Remove top cover.

2. Remove RFI shield.

3. Disconnect P8 from J8.

4. Reinstall RFI shield.

5. Remove bottom cover.

6. Place disk drive on left-hand side. Use a thin book or magazine to prop up drive. (Refer to Figure 2-1).

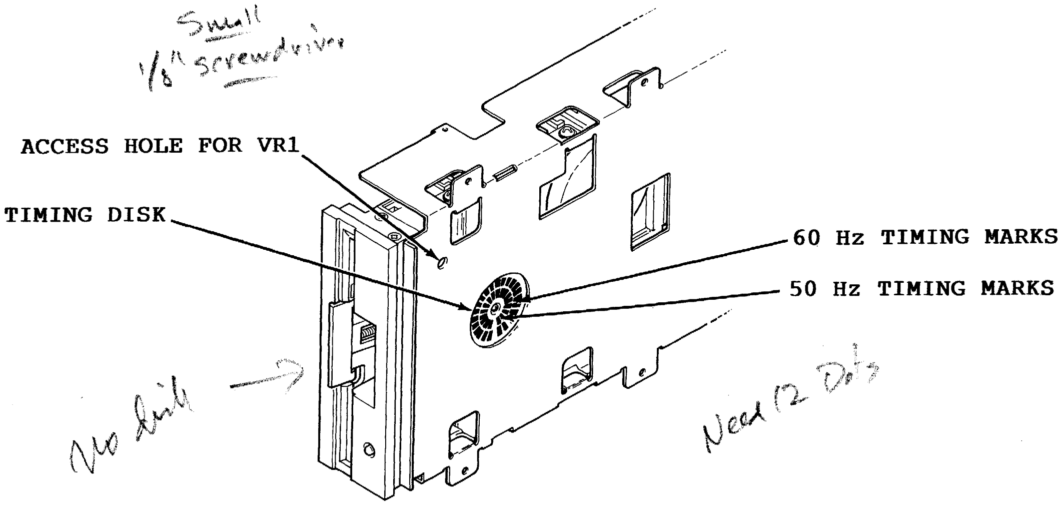


Figure 2-1. VIC-1541 Prepared for Calibration

2-4. Calibration

1. Connect VIC-20/COMMODORE 64 to video monitor or TV. (Refer to computer User's Guide for proper connection.)

2. Connect serial bus cable between P3 on VIC-1541 and serial bus connector on VIC-20/COMMODORE 64.

3. Connect AC power cord between J9 on VIC-1541 and AC outlet.

WARNING

- USE EXTREME CARE TO AVOID CONTACT WITH FRAME COMPONENTS. HIGH AC VOLTAGE POTENTIALS ARE PRESENT DURING CALIBRATION. THESE VOLTAGE POTENTIALS CAN CAUSE BODILY INJURY OR DEATH.

4. Place VIC-1541 power switch to ON.

5. Apply power to VIC-20/ COMMODORE 64.

6. If a VIC-20 is the computer being used, enter the following command:

```
OPEN 15,8,15,"UI-":CLOSE 15<Return>
```

7. Insert blank floppy disk into VIC-1541.

8. Plug timing strobe light into AC outlet. Position light near timing disk (Refer to Figure 2-1).

9. Enter following command into VIC-20/COMMODORE 64:

```
OPEN 15,8,15,"N0:CAL,01":CLOSE 15 <Return>
```

10. Adjust VR1 (Refer to Figure 2-1) until timing disk appears to stop.

NOTE

- If 60 Hz AC is being used, calibrate with the outer set of timing marks on the timing disk.
- If 50 Hz AC is being used, calibrate with the inner set of timing marks on the timing disk.
- If further time is required to adjust VR1, go back to Step 9 and re-enter command given.

11. After drive motor has stopped, place VIC-1541 power switch to OFF.

12. Remove serial bus cable and AC power cord.

13. Reassemble the VIC-1541.

Don't do

2-5. **Head Alignment**

2-5-1. General

This procedure aligns the read/write head to the physical tracks on a floppy disk. A truly accurate alignment requires the use of an alignment reference disk and a test program disk. The procedure which follows allows the user to "get by" without such software. However, the degree of success achieved will depend on the accuracy of the disk which is used. Consequently, the alignment may cause compatibility problems when using software recorded on other drives or when using other drives to read disks recorded on a drive aligned with this procedure. This problem may be reduced by selecting a pre-recorded disk which has not been written to since it was recorded at the factory. Although this procedure is not 100% accurate, it will usually suffice for the home user. For an accurate alignment of the drive unit, one of the following alignment systems is recommended:

1. COMMODORE System

   This system is available from:
   Commodore Business Machines,Inc.
   Customer Service Dept.
   1200 Wilson Dr.
   Westchester, Pa. 19380

Alignment disk	970160-01	$130
Test program disk	970154-01	$ 26
Service manual	9900445	$ 25
	Total=	$181

   The above items, plus a dual trace oscilloscope, are required to align a disk drive using the COMMODORE system.

2. Peltier Industries System

   This system is available from:
   Peltier Industries,Inc.
   735 N. Doris
   Wichita, Ks. 67212

   Disk Alignment System (DAS-1541) $39.95
   The system includes:
   - Alignment reference disk
   - Control disk
   - Instruction manual
   - Video detector

   The above items, plus a 3 1/2 digit, 100 Kohm digital voltmeter, are required to accurately align a disk drive using the Peltier Industries System.

2-5-2. Equipment Required

1. Alignment standard-use a factory recorded disk which has not been written to since purchase, or a disk which has been formatted on a VIC-1541 which is known to be in proper alignment.

2. Digital Voltmeter

3. Video detector-see Appendix A

2-5-3. Preparation for Mechanical Alignment (Detailed disassembly/assembly instructions can be found in the 1541 Maintenance Manual.)

1. Remove all external cables from VIC-1541

2. Remove upper cover.

3. Remove RFI Shield.

4. Remove Disk Controller PC Board.

5. Remove Drive Unit.

6. Reconnect J1 to P1, J2 to P2, J5 to P5, J6 to P6 and J7 to P7 in such a manner that access is still allowed to the stepping motor mount screws (See Figure 2-2).

CAUTION

DO NOT ALLOW PATHWORK ON DISK CONTROLLER PC BOARD TO CONTACT THE FRAME OR DRIVE UNIT ASSEMBLIES. USE AN INSULATING RUBBER MAT, IF NECESSARY, TO INSULATE THE DISK CONTROLLER PC BOARD FROM THESE ASSEMBLIES.

7. Connect video detector between DVM and pins 7 and 8 of UH7.

8. Remove any Glyptol or other substance from stepping motor mount screws (See Figure 2-2).

2-5-4. Head Alignment

1. Connect VIC-20/COMMODORE 64 to video monitor or TV. (Refer to computer User's Guide for proper connection.)

2. Connect serial bus cable between P3 on VIC-1541 and serial bus connector on VIC-20/COMMODORE 64.

3. Connect AC power cord between J9 on VIC-1541 and AC outlet.

WARNING

- USE EXTREME CARE TO AVOID CONTACT WITH FRAME COMPONENTS. HIGH AC VOLTAGE POTENTIALS ARE PRESENT DURING CALIBRATION. THESE VOLTAGE POTENTIALS CAN CAUSE BODILY INJURY OR EVEN DEATH.

4. Place VIC-1541 power switch to ON.

5. Apply power to VIC-20/COMMODORE 64.

6. If a VIC-20 is the computer being used, enter the following command:

```
OPEN 15,8,15,"UI-":CLOSE 15<Return>
```

7. Insert disk which will be used as the alignment standard into the VIC-1541.

8. Enter the following program into the computer. This program will place the head on track 16 and will leave the drive motor running.

```
10   OPEN 15,8,15,"U+":OPEN 2,8,2,"#":OPEN 8,8,8,"#"
20   PRINT #15,"B-P:";8;0:PRINT #15,"UA:";2;0;16;1
30   FOR X=1 TO 9:READ Y
40   PRINT #8,Y;
50   NEXT X
60   PRINT #15,"M-E"+CHR$(0)+CHR$(5)
70   STOP
80   DATA 173,0,28,9,4,141,0,28,96
```

what voltage ??

9. Type RUN<Return>.

10. Loosen two screws (See Figure 5-2) securing stepping motor housing to drive unit. Do not remove screws. Screws should be just loose enough to permit rotation of the stepping motor housing.

11. Rotate stepping motor housing while observing DVM display. Voltage reading on DVM will increase or decrease while rotating stepping motor housing. Correct position for stepping motor housing is the position which produces the largest voltage reading on DVM. Tighten the two screws when this position is reached.

12. Turn off DVM, disk drive and computer.

13. Disconnect all cables and test accessories from disk drive.

14. Apply small amount of Glyptol or fingernail polish to the two screws securing stepping motor housing to keep them from coming loose.

15. Reassemble the VIC-1541.

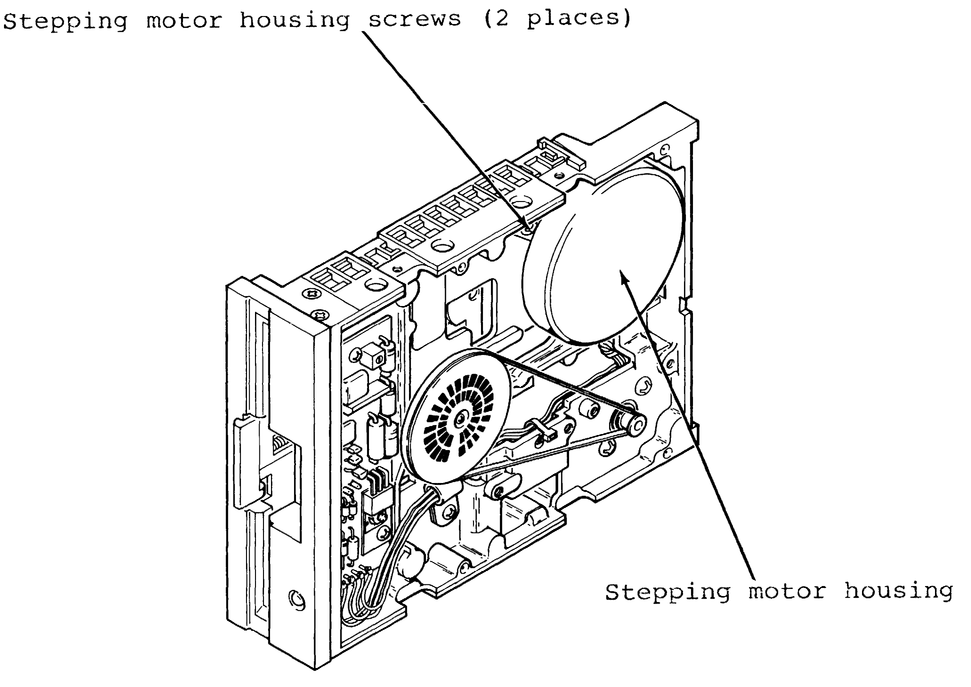


Figure 2-2. Head Alignment Adjustment

Don't Do

2-6. **Mechanical Alignment of Track #1 Stop**

2-6-1. General

This procedure adjusts the Track #1 Stop. The Track #1 Stop is used by the computer in the VIC-1541 for only two purposes:

1. Formatting a blank floppy disk ("New" command).

2. Soft error recovery.

The procedure that follows should only be used after carefully verifying that the rest of the VIC-1541 is properly operating. (Complete coverage of proper operation is given in Troubleshooting-Part 2, in the 1541 Maintenance Manual.)

2-6-2. Preparation for Mechanical Alignment (Detailed disassembly/assembly instructions can be found in the 1541 Maintenance Manual.)

1. Remove all external cables from VIC-1541.

2. Remove upper cover.

3. Remove RFI Shield.

4. Remove Disk Controller PC Board.

5. Remove Drive Unit.

6. Reconnect J1 to P1, J2 to P2, J5 to P5, J6 to P6 and J7 to P7 in such a manner that access is still allowed to the Track #1 Stop adjustment. (See Figure 2-3)

CAUTION

- DO NOT ALLOW PATHWORK ON DISK CONTROLLER PC BOARD TO CONTACT THE FRAME OR DRIVE UNIT ASSEMBLIES. USE AN INSULATING RUBBER MAT, IF NECESSARY, TO INSULATE THE DISK CONTROLLER PC BOARD FROM THESE ASSEMBLIES.

2-6-3. Mechanical Alignment

1. Connect serial bus cable between P3 and VIC-20/COMMODORE 64.

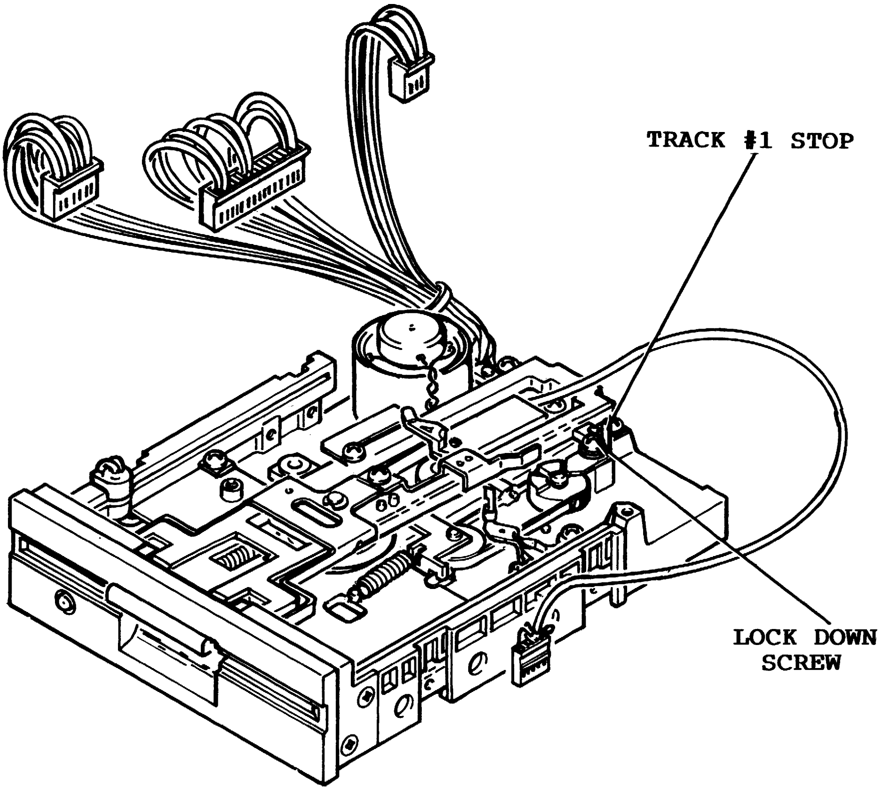


Figure 2-3. Track #1 Stop Adjustment.

2. Connect AC line cord between J9 and AC outlet.

WARNING

- DO NOT CONTACT THE FRAME ASSEMBLY OR WIRING. THE VOLTAGE POTENTIALS PRESENT ON THESE PARTS COULD CAUSE SEVERE INJURY OR DEATH.

3. Place VIC-1541 power switch to ON and place power switch on computer being used to ON.

NOTE

- If the VIC-20 is the computer in use, enter the following command:
  OPEN 15, 8, 15, "U-": CLOSE 15 <return>.

4. Load the Display T&S program into the computer. This program may be loaded from the Test Demo disk or it may be manually entered from the keyboard (The Display T&S program is listed in Appendix C of the VIC-1541 Single Drive Floppy Disk User's Manual.).

5. Place a factory recorded floppy disk into the VIC-1541.

6. Enter "RUN" <return> into the computer.

7. When the Display T&S program asks for a Track and Sector, enter Track 1, Sector 1.

8. After the head settles and the Display T&S program begins displaying Track information, adjust the Track #1 Stop adjustment in the following manner (See Figure 2-3):

   a. Loosen the adjustment lock-down screw.

   b. Place .006 inch feeler gauge between Stop and potrusion on the stepping motor hub. Carefully adjust the Stop until feeler gauge just touches the potrusion on the stepping motor hub and the Stop.

NOTE

- Do not disturb position of the stepping motor shaft.

   c. Tighten the adjustment lock-down screw.

9. Place VIC-1541 and VIC-20/COMMODORE 64 power switches to OFF.

10. Reassemble the VIC-1541.

SECTION 3
TROUBLESHOOTING

Section 3-TROUBLESHOOTING

3-1. General

This section requires only a Multimeter (digital type is recommended) and will isolate a problem down to the sub-assembly level. It is set up so that even an electronics novice can perform the procedures. Troubleshooting consists of step-by-step procedures with accompanying illustrations. Each step either asks a question or refers to the following step. When a question is asked, answer the question with a "Yes" or "No". Below each question are two blocks labeled "Yes" and "No". Follow the instructions in the appropriate block. The instructions will either lead to another step or will isolate the problem to a particular sub-assembly. At this point, the faulty sub-assembly may be replaced or the sub-assembly may be repaired down to the component level using the procedures in Troubleshooting-Part 2 in the 1541 Maintenance Manual.

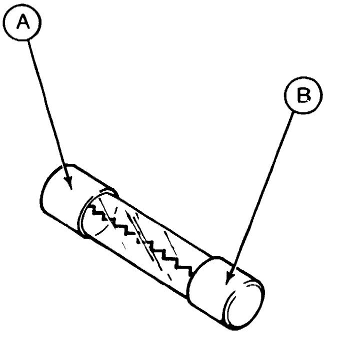
8-2. TROUBLESHOOTING-PART 1

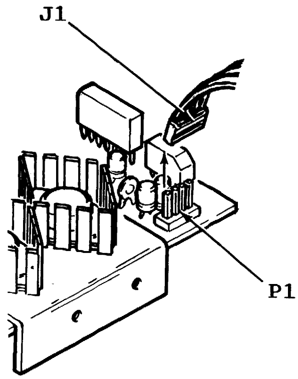
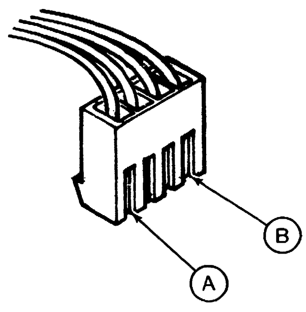
<table>
<tr><th>STEP</th><th colspan="2">PROCEDURE</th><th>ILLUSTRATION</th></tr>
<tr><td rowspan="3">1</td><td colspan="2">Remove AC line cord and serial bus cables. Remove top cover. Remove fuse from fuseholder. Measure resistance of the fuse as follows:

1. Set DMM (Digital Multimeter) to Ohms x 10 or Ohms x 100.

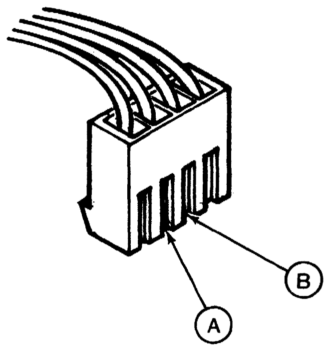
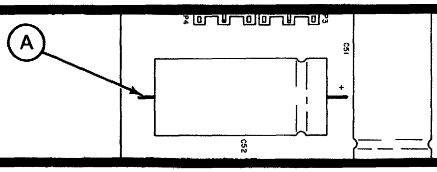
2. Connect common lead of DMM to one end of fuse (A).

3. Connect positive lead of DMM to other end of fuse (B).

Does DMM display less than 10 ohms?</td><td rowspan="3">
</td></tr>
<tr><td>YES</td><td>NO</td></tr>
<tr><td>Install fuse and proceed with Step 2.</td><td>Replace fuse with a new fuse of proper rating & size. Then proceed with Step 2.</td></tr>
</table>

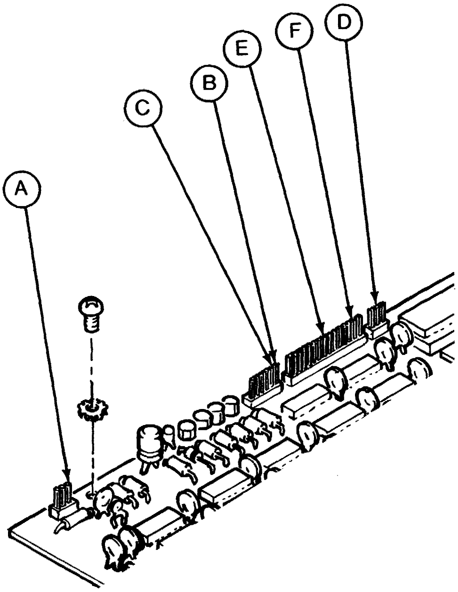
STEP	PROCEDURE	ILLUSTRATION
2	Determine proper operation of the frame assembly as follows: 1. Disconnect J1 from P1. 2. Set DMM to measure Volts AC. 3. Connect negative lead of DMM to pin 1 of J1 (A). 4. Connect positive lead of DMM to pin 4 of J1 (B). 5. Connect AC line cord between J9 (the AC power receptacle) and an AC outlet. **WARNING** DO NOT CONTACT ANY AC DISTRIBUTION LINES. 6. Place power switch to ON. Does DMM display between 15 and 21.5 Vrms?	 

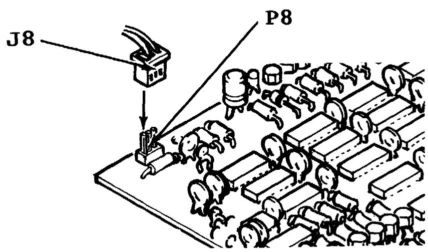
YES	NO
Proceed to Step 3.	Place power switch to OFF. Remove AC line cord. Fault lies in Frame Assembly. Re-pair or replace Frame Assembly.

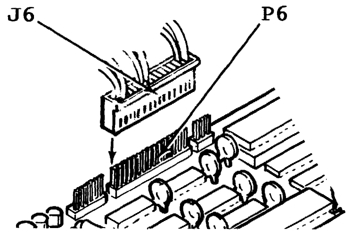
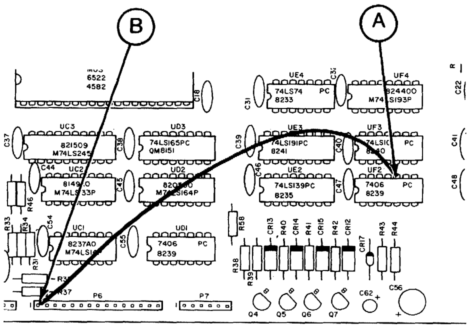
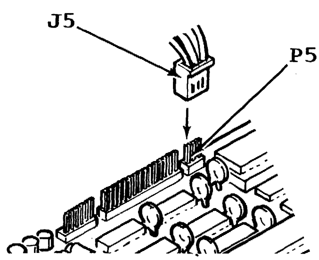
STEP	PROCEDURE	ILLUSTRATION
3	Continue testing Frame Assembly as follows: 1. Place power switch to OFF. 2. Connect negative lead of DMM to pin 2 of J1 (A). 3. Connect positive lead of DMM to pin 3 of J1 (B). 4. Place power switch to ON. Does DMM display between 9.5 and 13.5 Vrms? **YES:** Frame Assembly appears to be working properly. Proceed to Step 4. **NO:** Place power switch to OFF. Remove AC line cord. Fault lies in Frame Assembly. Repair or replace Frame Assembly.	
4	Place power switch to OFF. Remove AC line cord. Remove shield. Disconnect J2 from P2, J5 from P5, J6 from P6, J7 from P7 and J8 from P8. Proceed to Step 5.	**SEE FIG. 9-2**
5	Reconnect J1 to P1. Connect AC line cord to VIC-1541. Connect common lead of DMM to (-) side of C52 (A). Set DMM to 20 VDC range. Proceed to Step 6.	

<table>
<tr><th>STEP</th><th colspan="2">PROCEDURE</th><th>ILLUSTRATION</th></tr>
<tr><td rowspan="3">6</td><td colspan="2">Place power switch to ON. Measure tests points in table below. Touch positive lead of DMM to indicated test point. Verify that each measurement is within the minimum and maximum limits given.

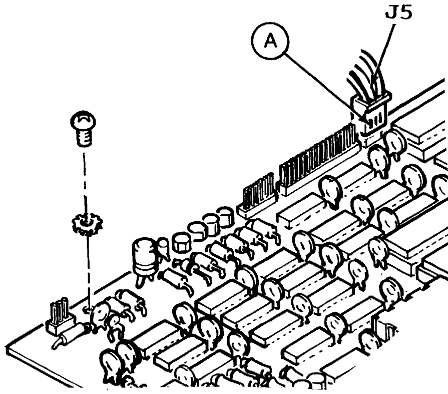
Test Point / Min. / Max.
P8,pin1(A) +4.6V +5.25V
P7,pin1(B) +11.4V +12.6V
P7,pin2(C) +11.4V +12.6V
P5,pin2(D) +11.4V +12.6V
P6,pin8(E) +4.75V +5.25V
P6,pin2(F) +4.6V +5.25V

Are all measurements above within limits specified?</td><td rowspan="3">
</td></tr>
<tr><td>YES</td><td>NO</td></tr>
<tr><td>Place power switch to OFF. Proceed to Step 7.</td><td>Place power switch to OFF. Remove AC line cord. Fault lies in Disk Controller PC Board. Repair or replace.</td></tr>
<tr><td rowspan="3">7</td><td colspan="2">Connect J8 to P8. Place power switch to ON. 4

Is green LED illuminated?</td><td rowspan="3">
</td></tr>
<tr><td>YES</td><td>NO</td></tr>
<tr><td>Place power switch to OFF. Proceed to Step 8.</td><td>Place power switch to OFF. Remove AC line cord. Fault lies in Case Assembly. Repair or replace.</td></tr>
</table>

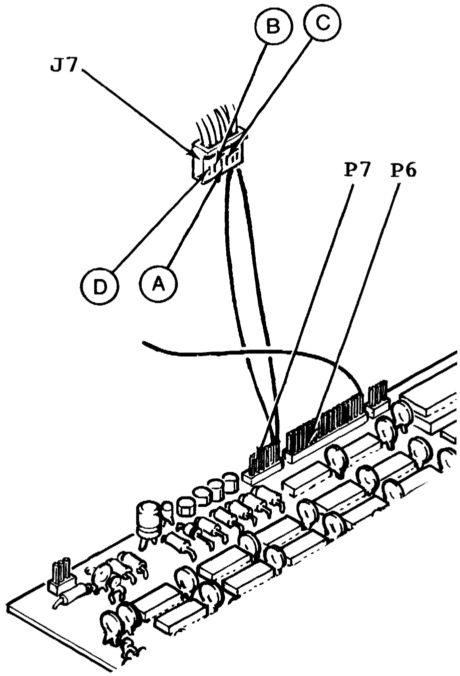
STEP	PROCEDURE	ILLUSTRATION
8	Connect J6 to P6. Place power switch to ON. Does red LED come on momentarily? **YES:** Place power switch to OFF. Proceed to Step 10. **NO:** Proceed to Step 9.	
9	Using a short piece of wire, carefully short pin 10 of UF2E (A) to pin 1 of P6 (B) while observing the red LED (Error/Access LED). Does red LED illuminate? **YES:** Place power switch to OFF. Fault lies in Disk Controller PC Board. Repair or replace. **NO:** Place power switch to OFF. Fault lies in Drive Unit. Repair or replace.	
10	Connect J5 to P5. Place power switch to ON. Does drive motor turn while red LED is on? **YES:** Place power switch to OFF. Proceed to Step 12. **NO:** Place power switch to OFF. Proceed to Step 11.	

<table>
<tr><th>STEP</th><th colspan="2">PROCEDURE</th><th>ILLUSTRATION</th></tr>
<tr><td rowspan="3">11</td><td colspan="2">Connect positive lead of DMM to pin 3 of J5 (A). Observe DMM while placing power switch to ON.

Does DMM indicate 0.0 to +0.8 V when the red LED is illuminated?</td><td rowspan="3">
</td></tr>
<tr><td>YES</td><td>NO</td></tr>
<tr><td>Place power switch to OFF. Fault lies in Drive Unit PC Board. Repair or replace.</td><td>Place power switch to OFF. Fault lies in Disk Controller PC Board Repair or replace.</td></tr>
<tr><td rowspan="3">12</td><td colspan="2">Using two short lengths of wire, carefully connect pins 1 and 2 of J7 to pin 1 of P7. Place power switch to ON. Using a third piece of wire, short sequentially between pin 1 of P6 and each of the test points indicated below. Observe read/write head while shorting each test point.

1. J7, pin 4 (A)
2. J7, pin 5 (B)
3. J7, pin 3 (C)
4. J7, pin 6 (D)

Verify that the read/write head moves toward the front of the VIC-1541. Repeat the procedure in reverse order and verify that the read/write head moves toward the rear.

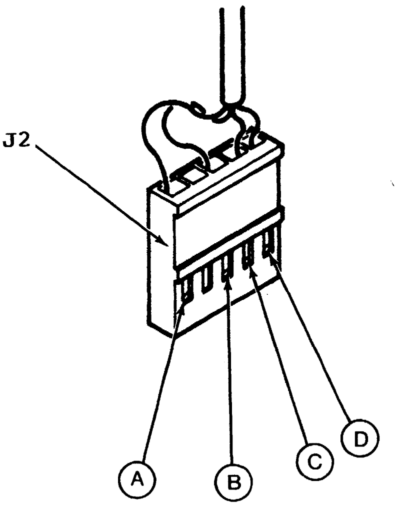
Does the read/write head move in the proper direction?</td><td rowspan="3">
</td></tr>
<tr><td>YES</td><td>NO</td></tr>
<tr><td>Place power switch to OFF. Proceed to Step 13.</td><td>Place power switch to OFF. Fault lies in Drive Unit.</td></tr>
</table>

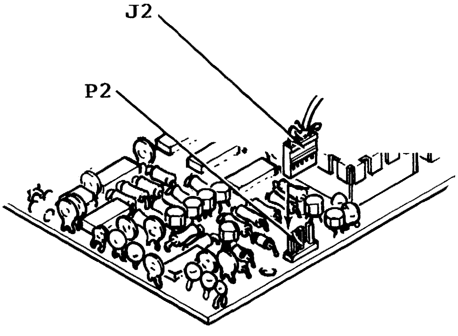
<table>
<tr><th>STEP</th><th colspan="2">PROCEDURE</th><th>ILLUSTRATION</th></tr>
<tr><td rowspan="3">13</td><td colspan="2">Remove wires from J7. Connect J7 to P7. Remove negative lead of DMM from (-) side of C52. Set DMM to Ohms x 10 or Ohms x 100 range. Connect negative and positive leads of DMM to pins of J~~2~~8 as indicated in table below. Verify resistances indicated on DMM are within limits given in table.

(-) lead / (+) lead / Ohms Min. / Ohms Max.
pin1(A) / pin5(D) / 29 / 39
pin1 / pin4(C) / 12 / 22
pin1 / pin3(B) / 23 / 33

NOTE

This resistance check of the read/write head does not check its dynamic characteristics. If in doubt about the condition of the read/write head, refer to Part 2 of Troubleshooting.

Are all resistances correct?</td><td rowspan="3">
</td></tr>
<tr><td>YES</td><td>NO</td></tr>
<tr><td>Place power switch to OFF. Proceed to Step 14.</td><td>Fault lies in Drive Unit. Replace.</td></tr>
</table>

STEP	PROCEDURE	ILLUSTRATION
14	Connect J2 to P2. Perform Calibration procedure in Section 2. Is drive motor rotating at correct speed? **YES:** At this point the problem lies in the Disk Controller PC Board or in the Drive Unit. To determine which of the two sub-assemblies is bad, refer to Part 2 of Troubleshooting in the 1541 Maintenance Manual. Part 2 requires an oscilloscope and some technical experience. If you do not wish to attempt Part 2, try swapping the Disk Controller PC Board or the Drive Unit with a known good assembly and see if the problem is solved. Also, check assemblies for obvious signs of wear or damage. **NO:** Fault lies in Drive Unit. Replace.	

SECTION 4
SCHEMATICS
AND
PARTS LAYOUT

Section 4-SCHEMATICS AND PARTS LAYOUTS

4-1. General

This section contains Schematics, Parts Layout Drawings, a Functional Block Diagram and an Interconnect Diagram. These figures are provided for reference purposes. The following index is provided for user convenience:

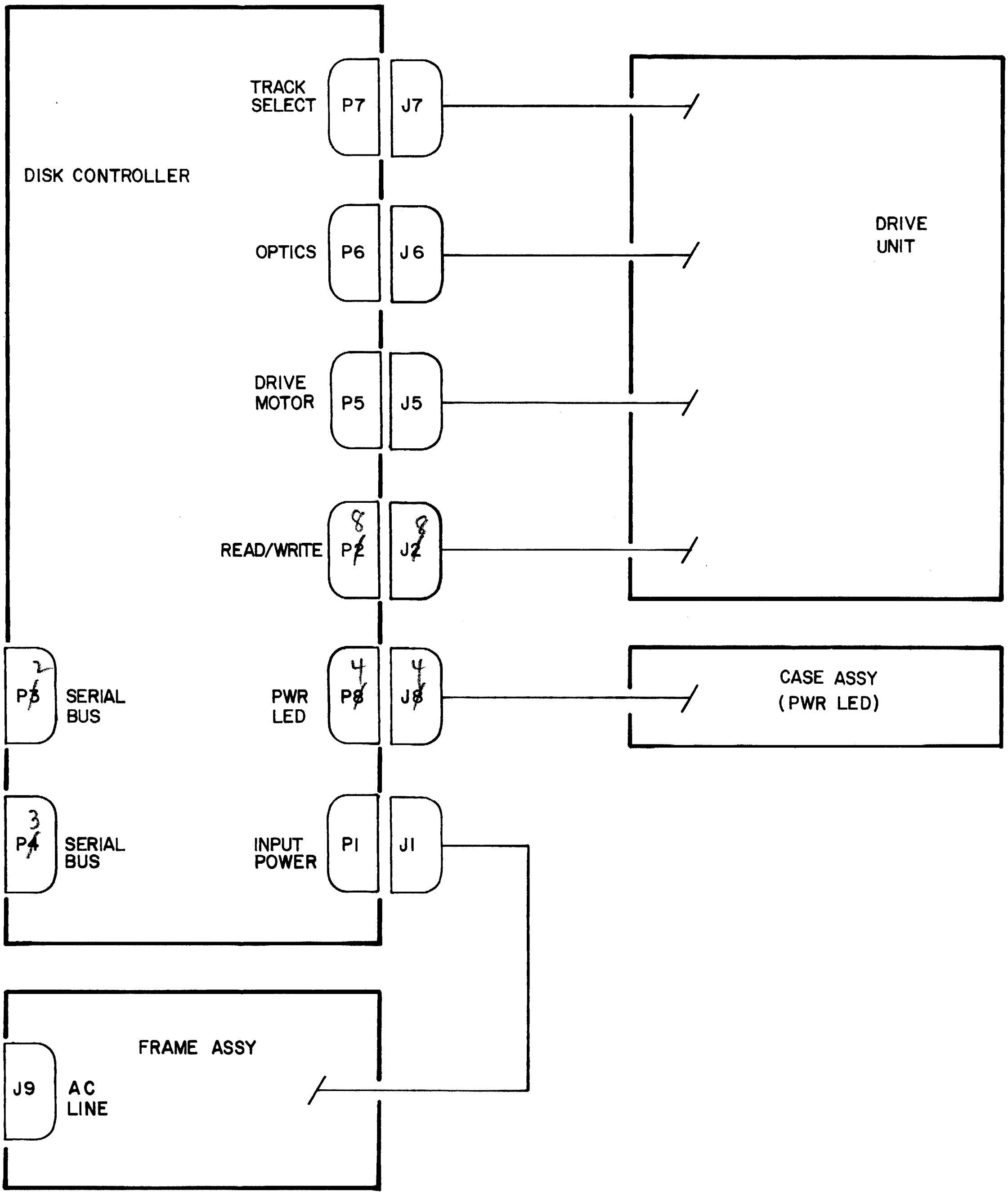


Figure 4-1. Interconnect Diagram

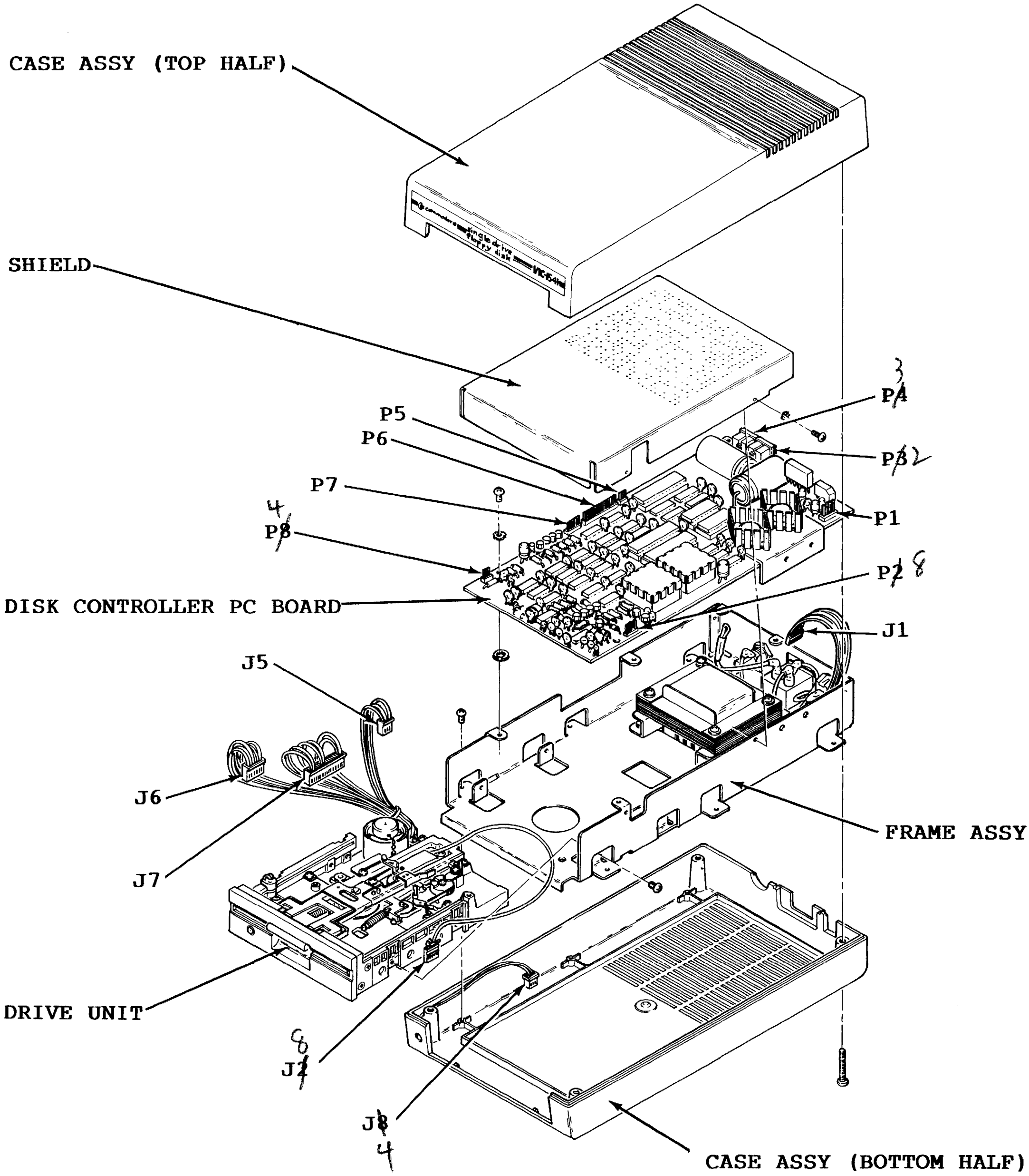


Figure 4-2. Sub-Assembly Identification

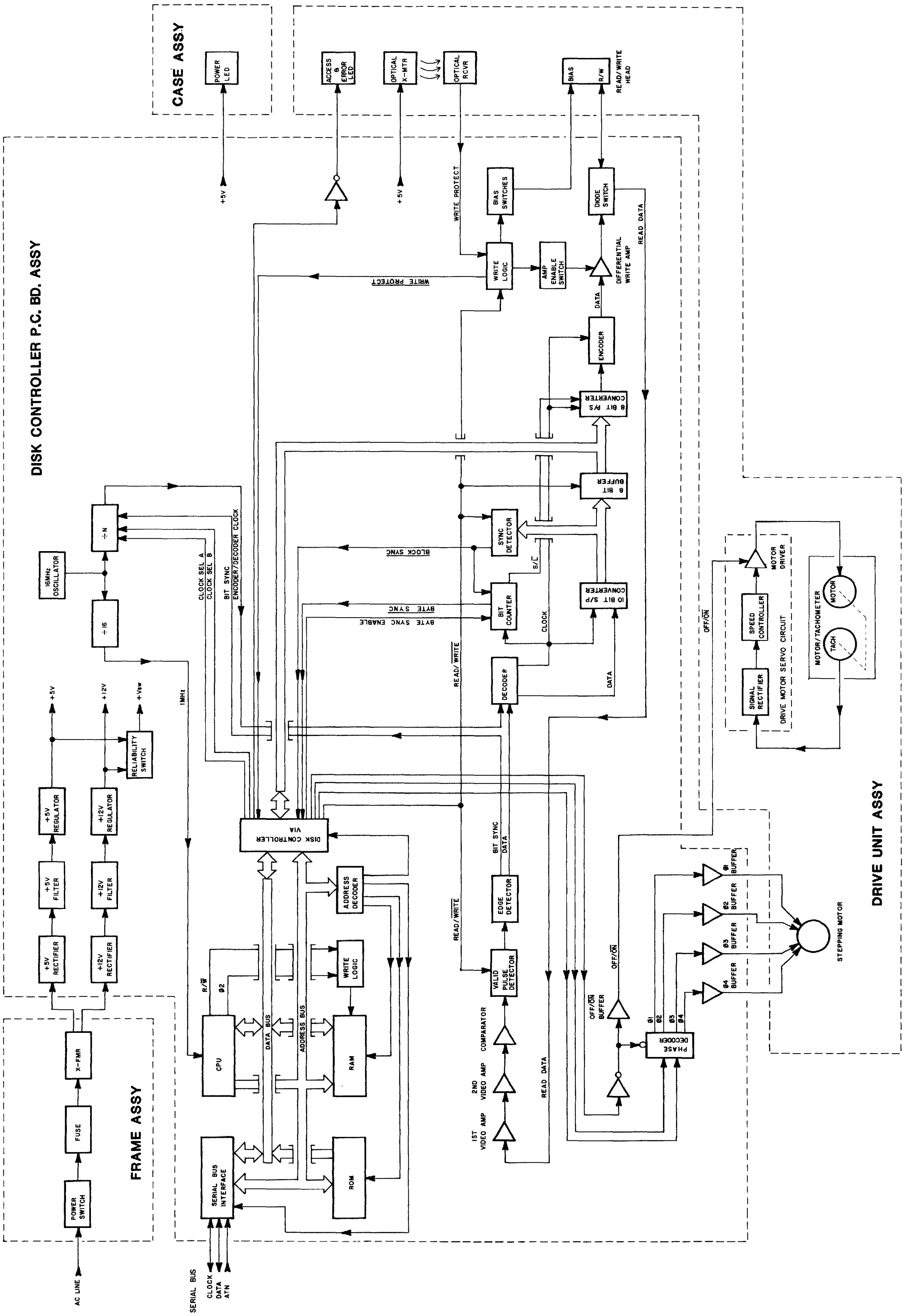
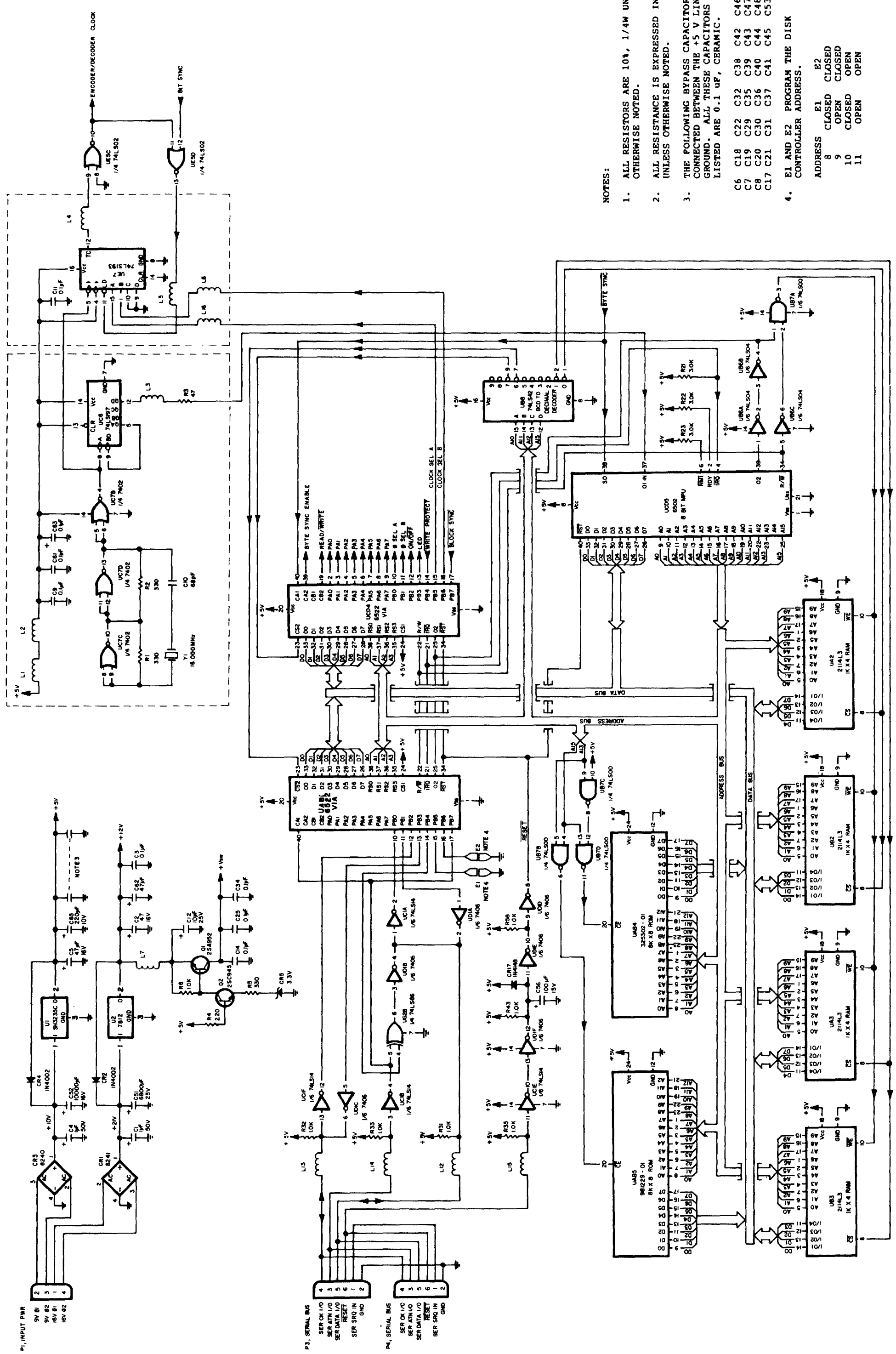


Figure 4-3. Functional Block Diagram



NOTES:

1. ALL RESISTORS ARE 10%, 1/4W UNLESS OTHERWISE NOTED.
2. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
3. THE FOLLOWING BYPASS CAPACITORS ARE CONNECTED BETWEEN THE +5 V LINE AND GROUND. ALL THESE CAPACITORS LISTED ARE 0.1 uF, CERAMIC.

C6	C18	C22	C32	C38	C42	C46	C54
C7	C19	C29	C35	C39	C43	C47	C55
C8	C20	C30	C36	C40	C44	C48	C60
C17	C21	C31	C37	C41	C45	C53	C64

4. E1 AND E2 PROGRAM THE DISK CONTROLLER ADDRESS.

ADDRESS	E1	E2
8	CLOSED	CLOSED
9	OPEN	CLOSED
10	CLOSED	OPEN
11	OPEN	OPEN

Figure 4-4. Disk Controller, Schematic (Sht. 1 of 2)

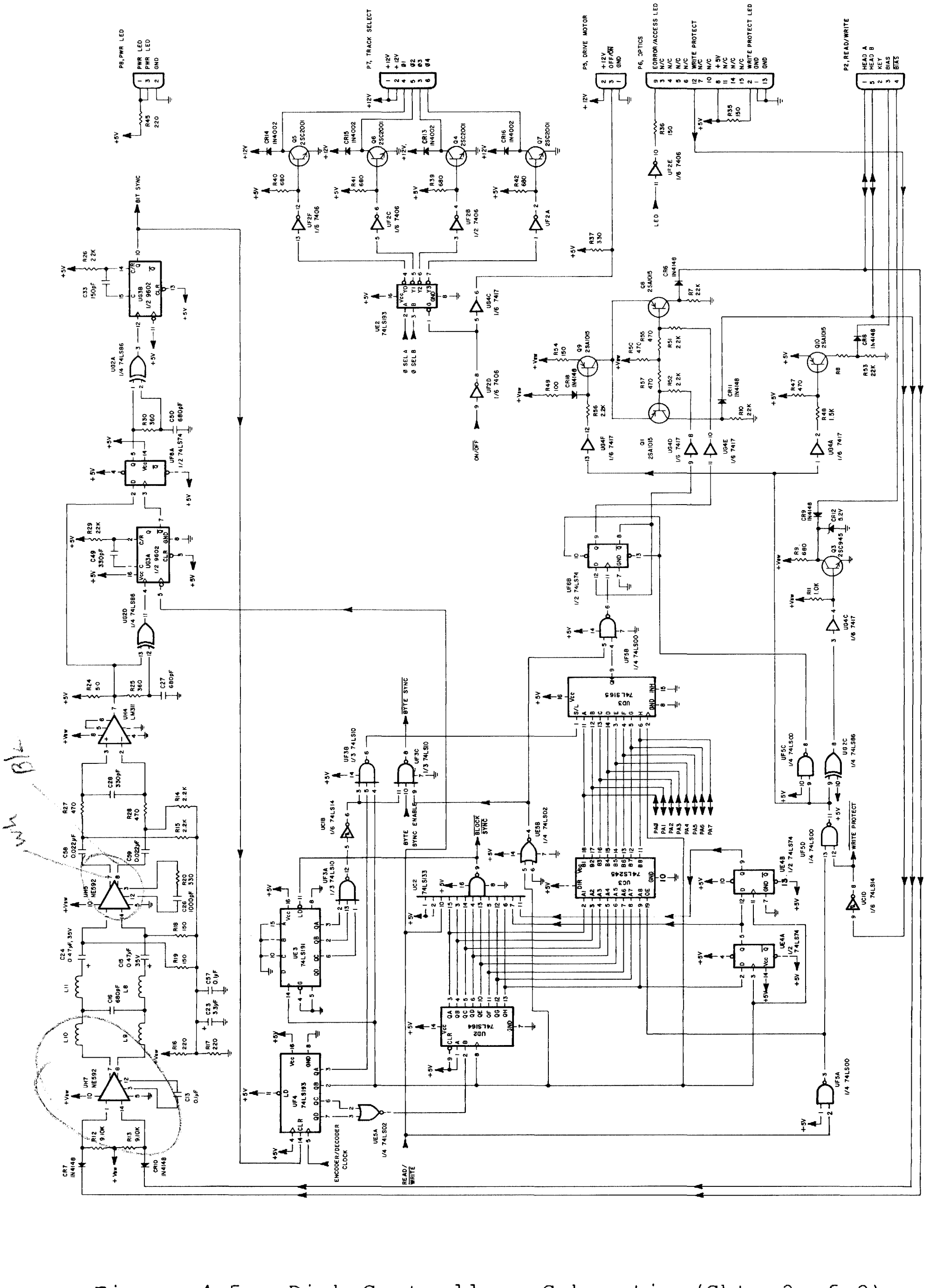


Figure 4-5. Disk Controller, Schematic (Sht. 2 of 2)

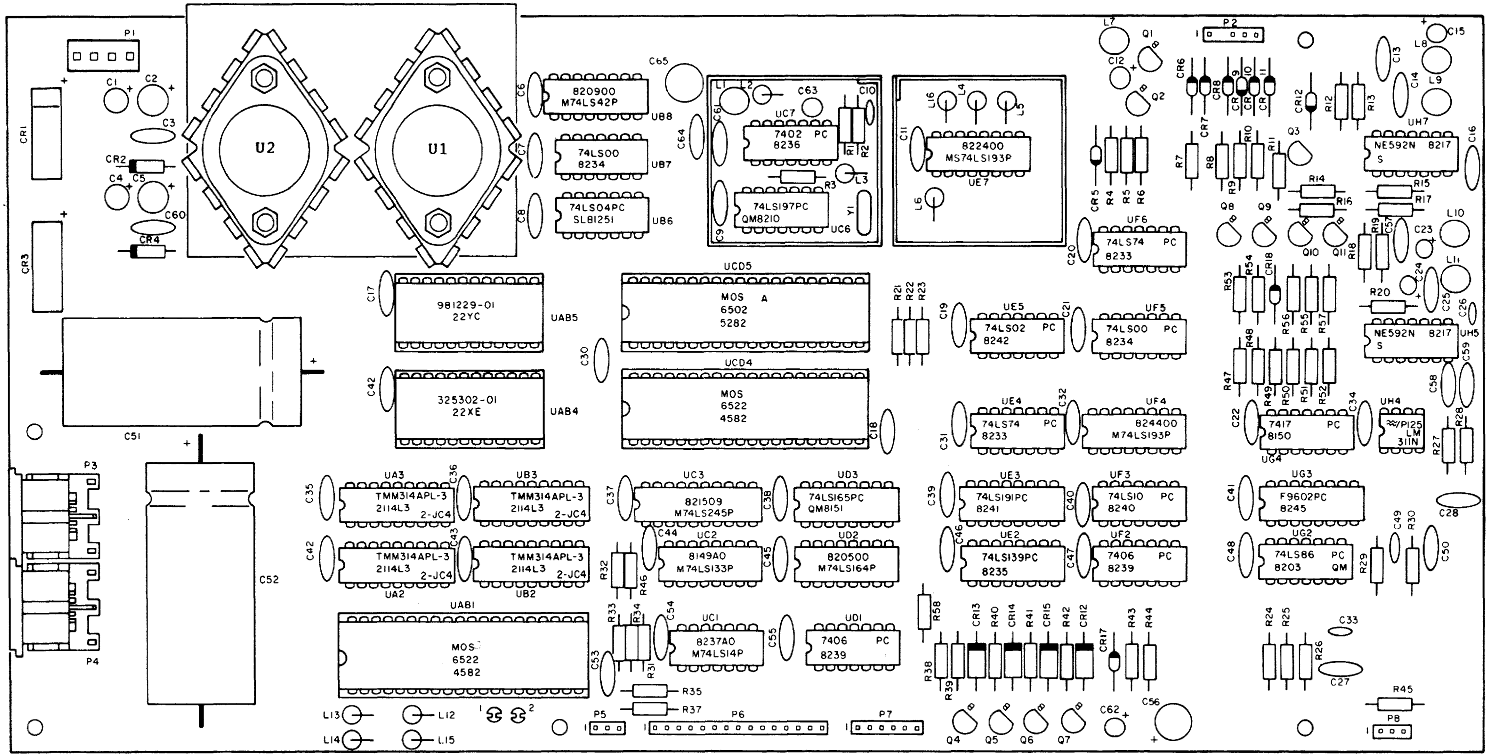


Figure 4-6. Disk Controller, Parts Layout

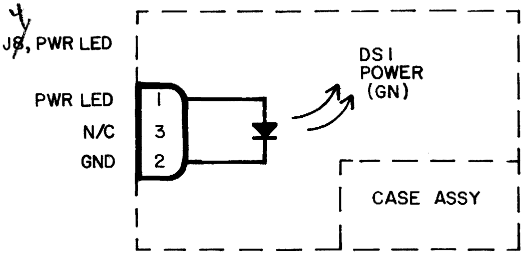


Figure 4-7. Case Assy, Schematic

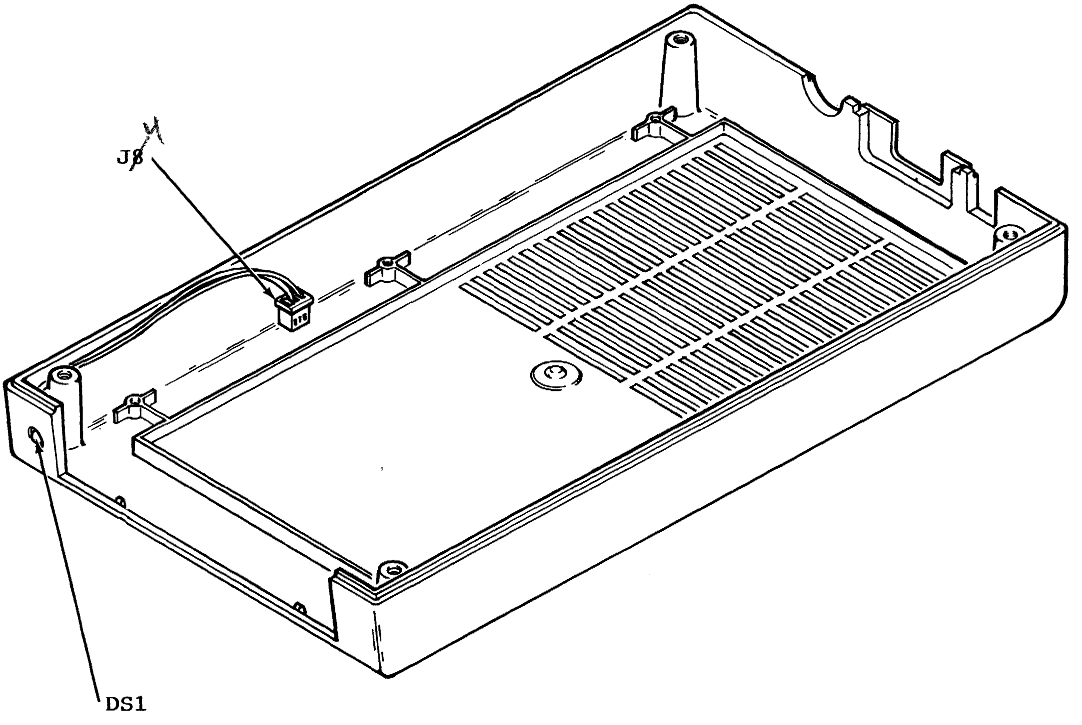


Figure 4-8. Case Assy, Parts Layout

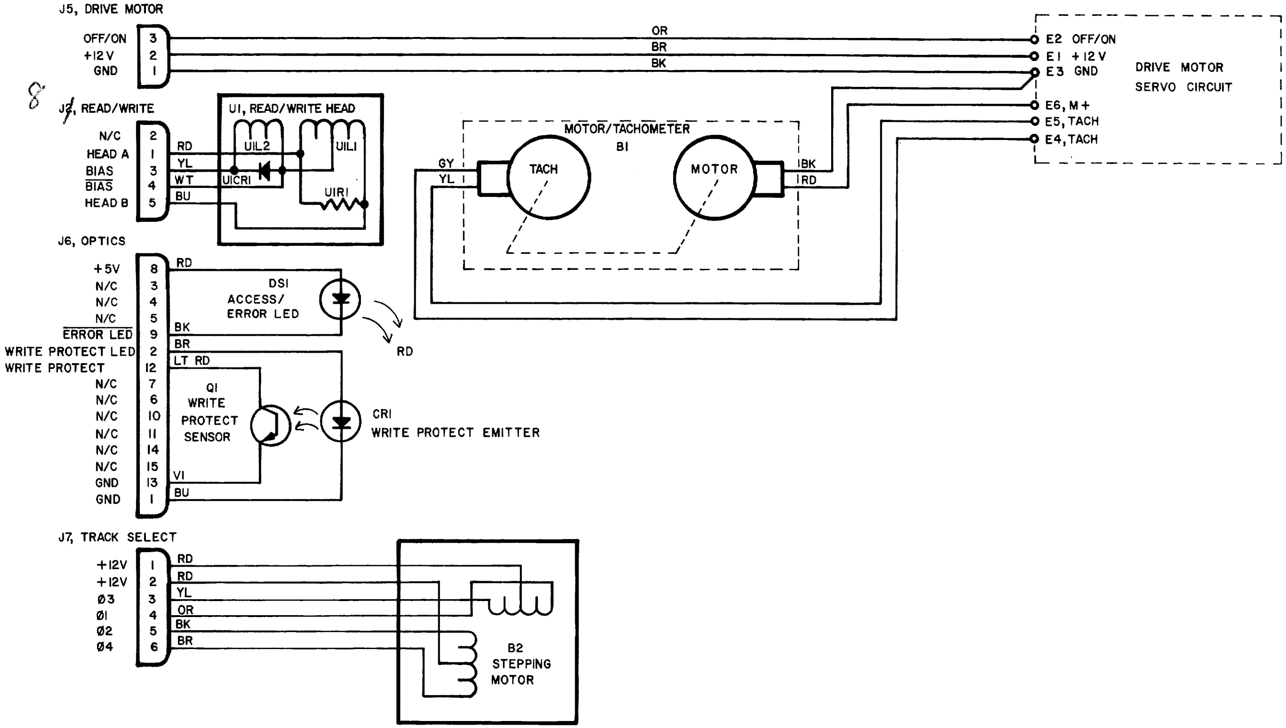


Figure 4-9. Drive Unit, Schematic

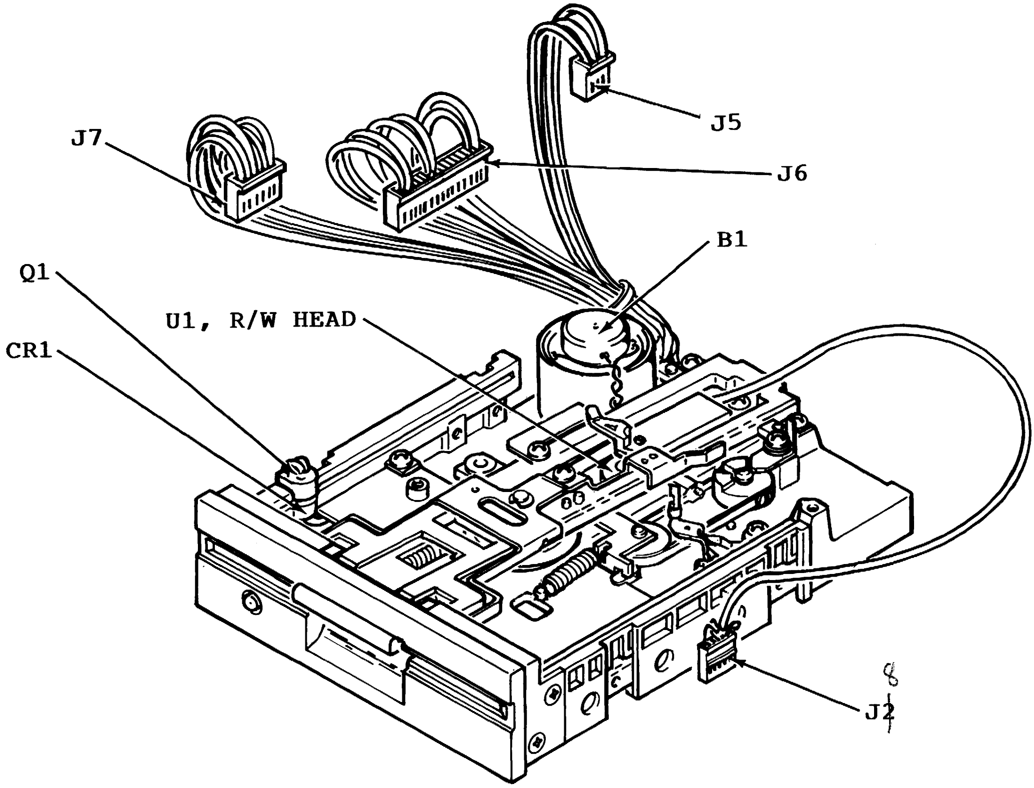


Figure 4-10. Drive Unit, Parts Layout (Top)

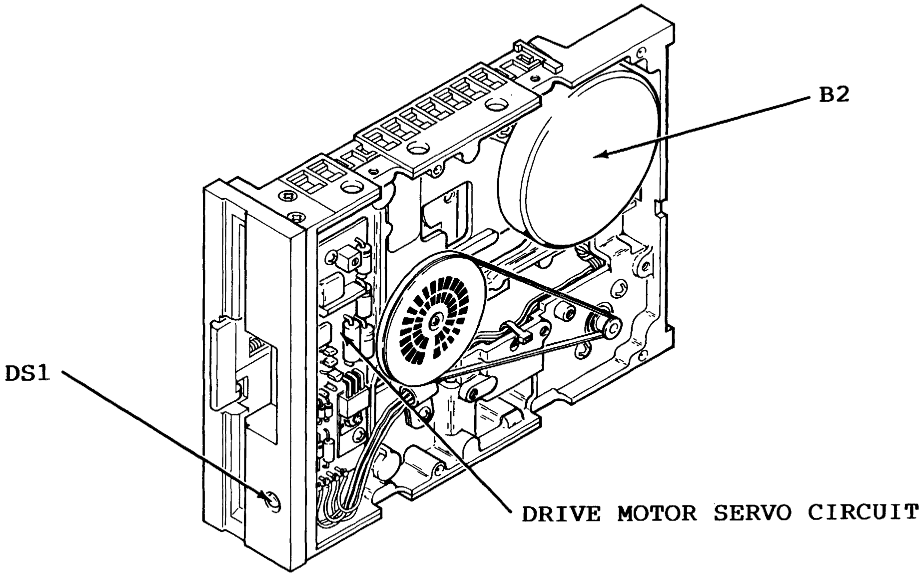


Figure 4-11. Drive Unit, Parts Layout (Bottom)

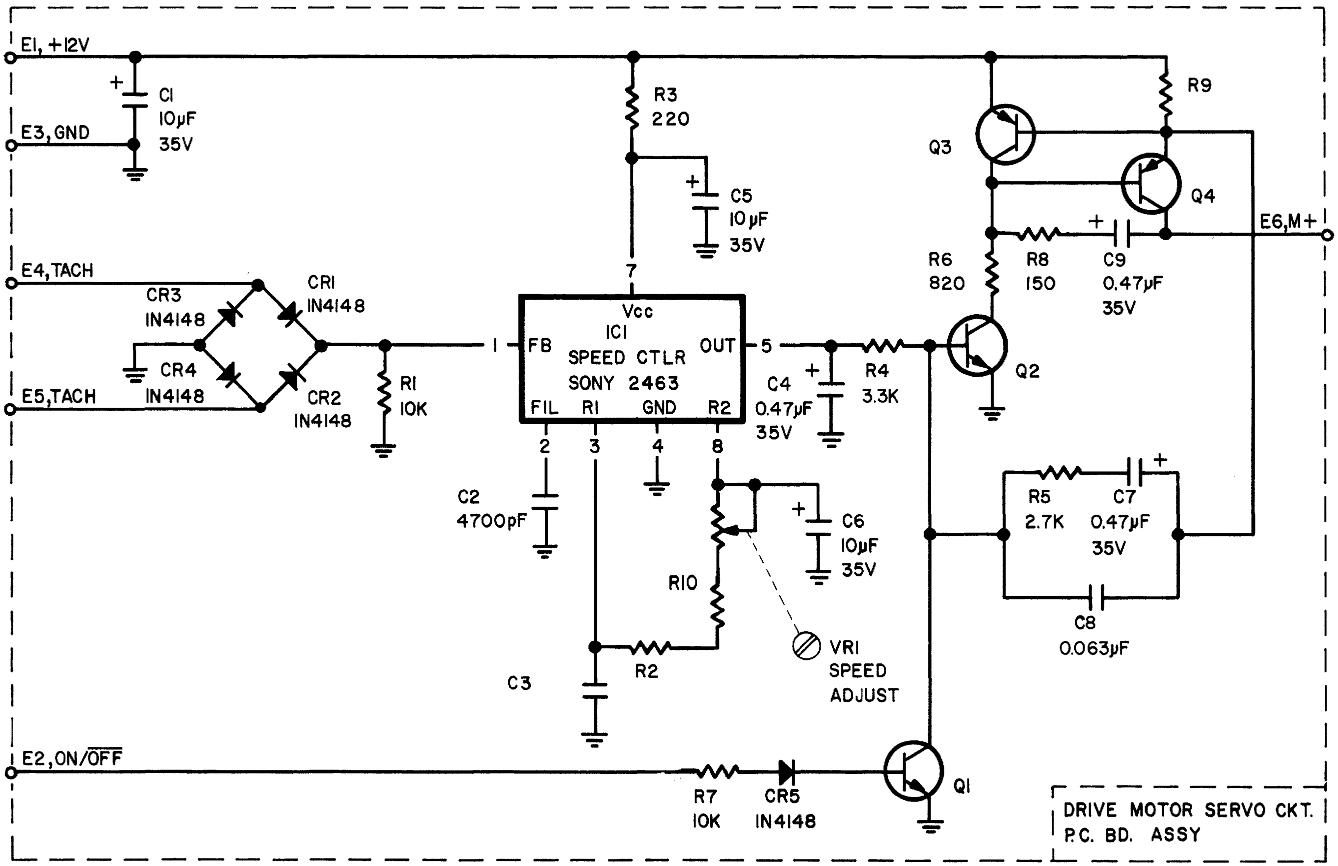


Figure 4-12. Drive Servo Circuit, Schematic

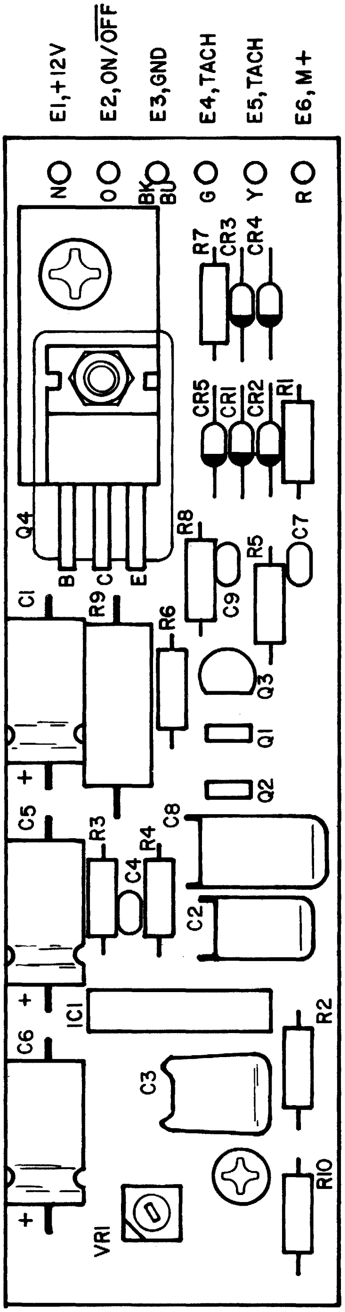


Figure 4-13. Drive Servo Circuit, Parts Layout

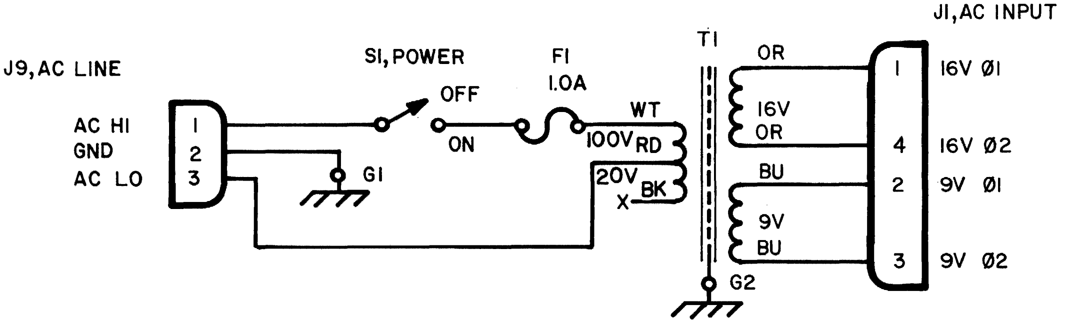


Figure 4-14. Frame Assy, Schematic (For use with P.C.Bd. 1540048-xx)

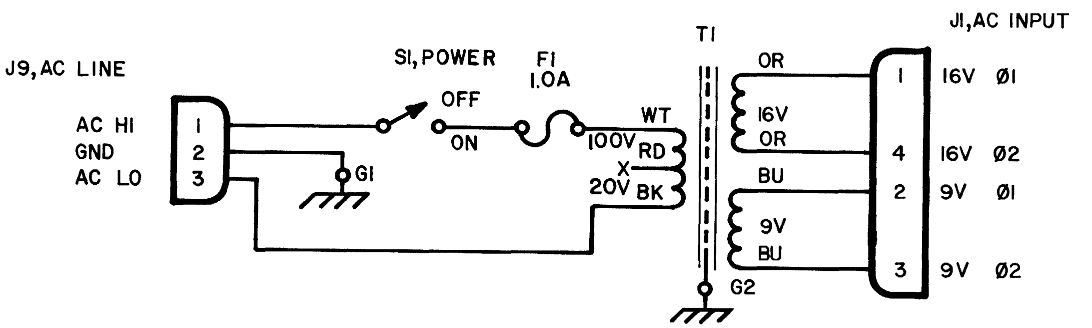


Figure 4-15. Frame Assy, Schematic (For use with P.C.Bd. 1540001-xx)

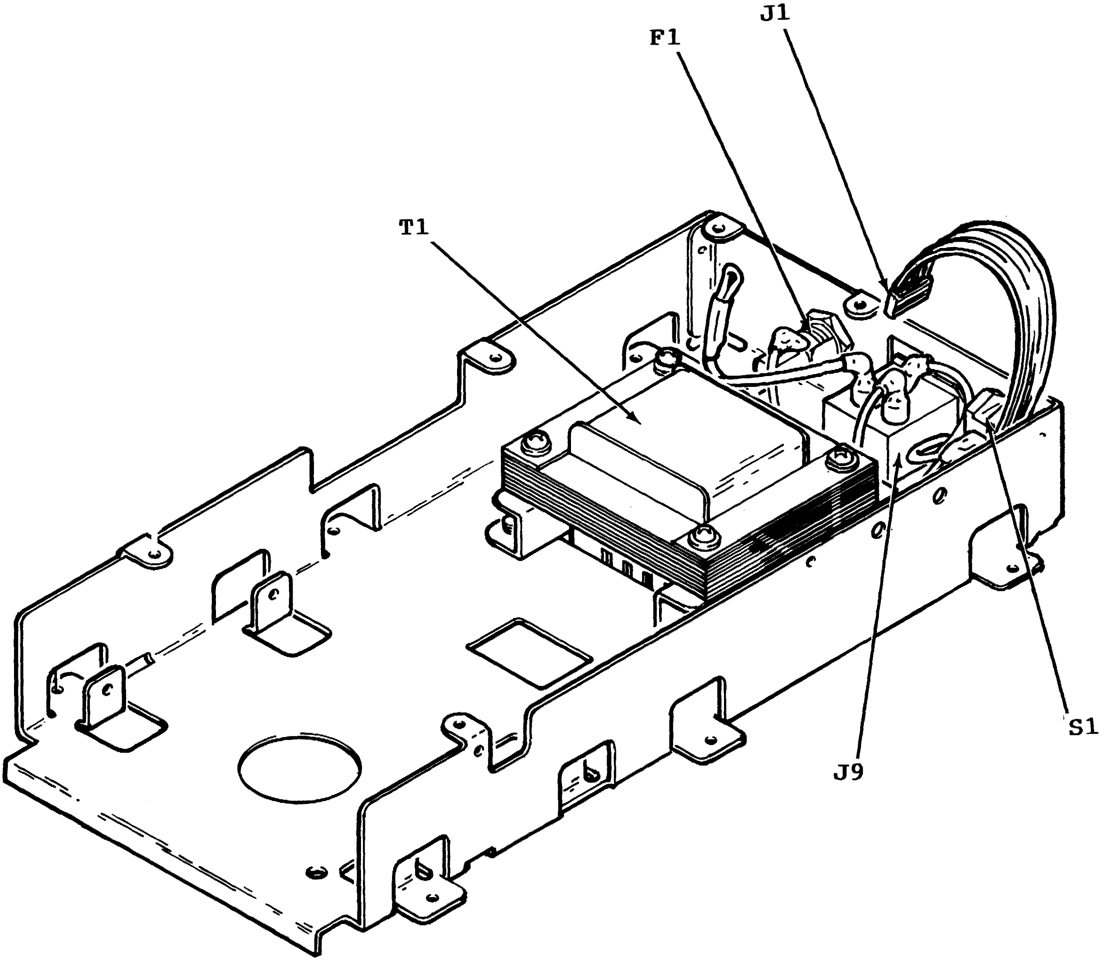


Figure 4-16. Frame Assy, Parts Layout

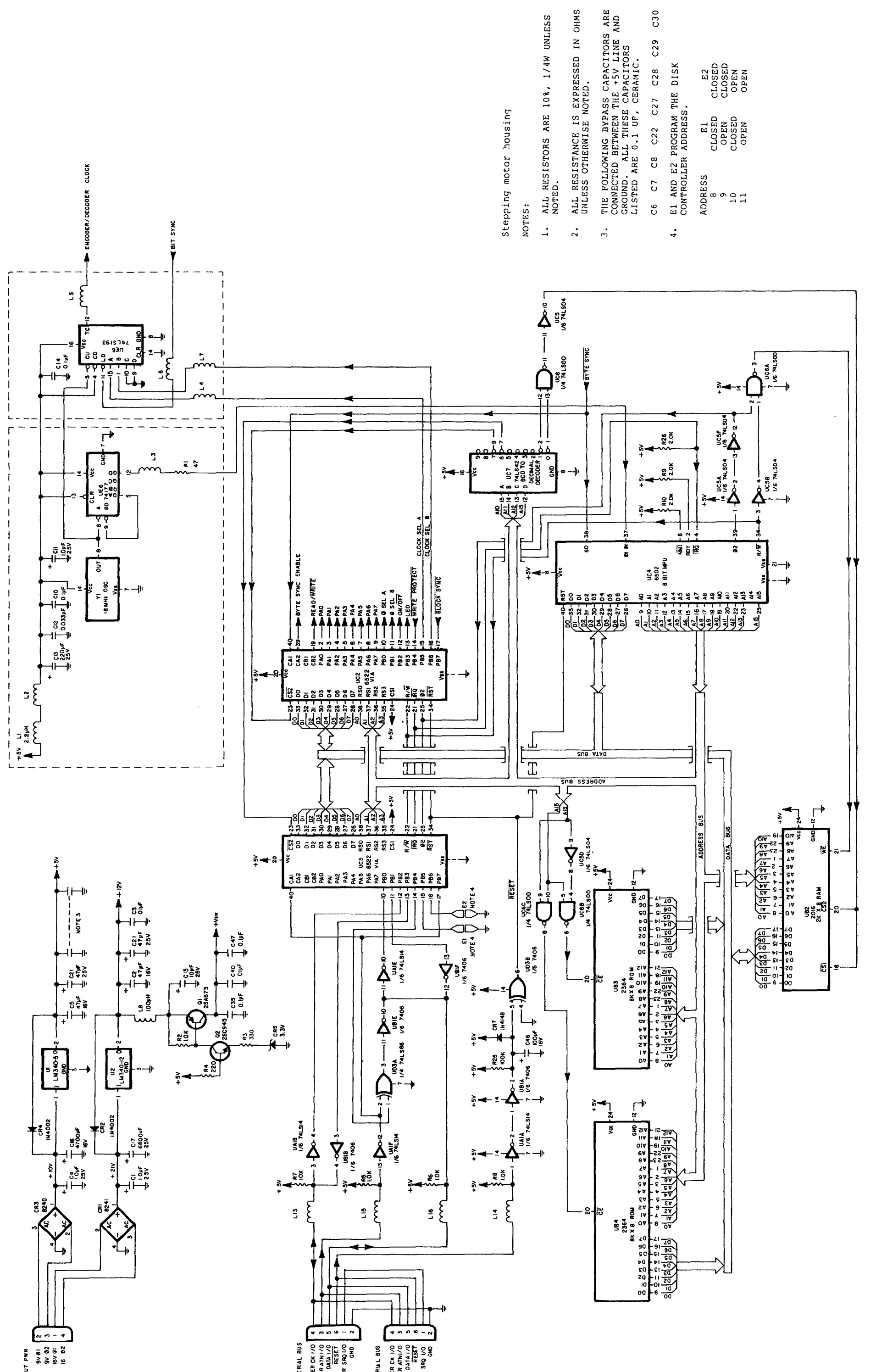


Figure 4-17. 1541 Disk Controller, Schematic (Sht. 1 of 2)

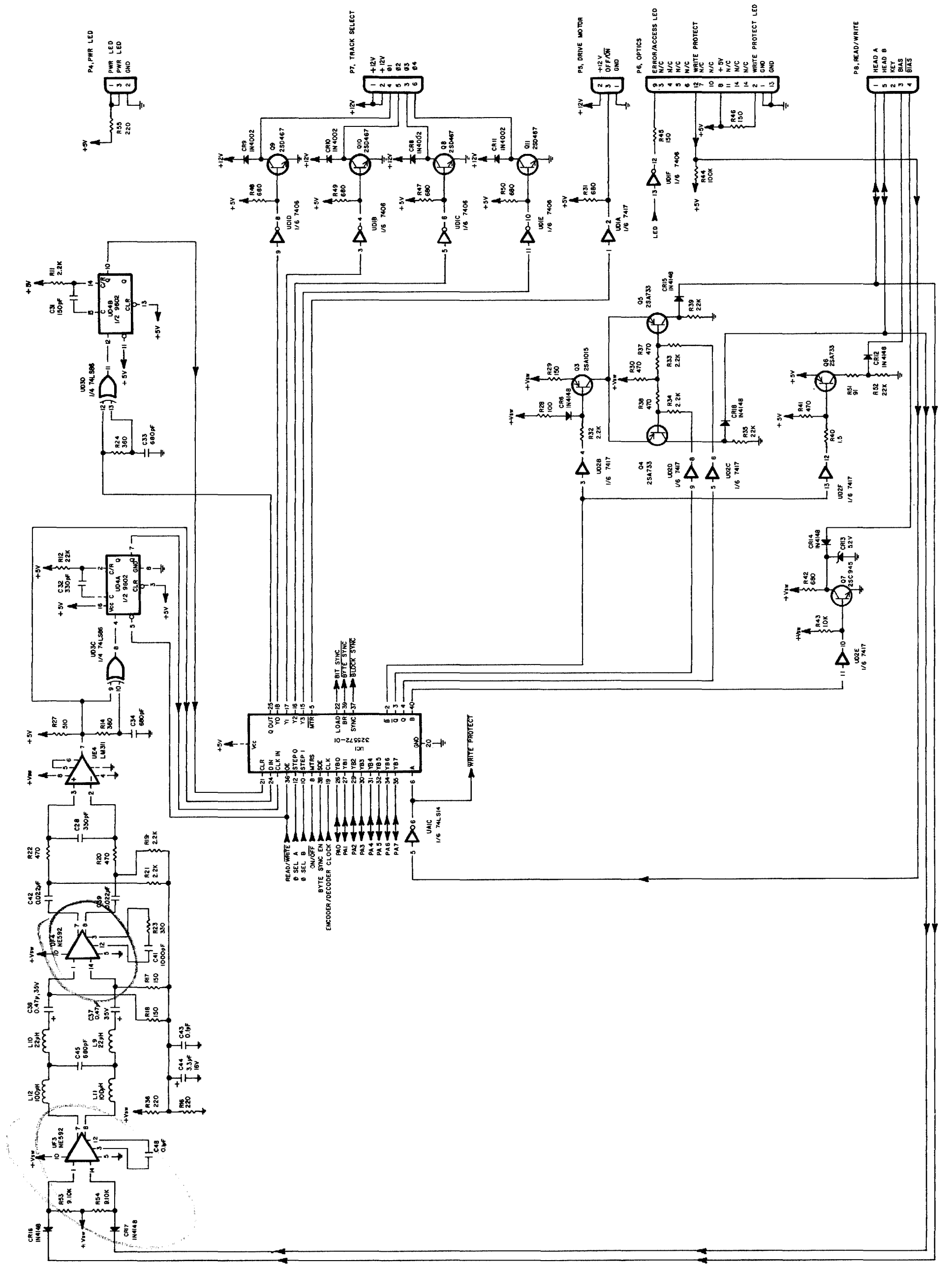


Figure 4-18. 1541 Disk Controller, Schematic (Sht. 2 of 2)

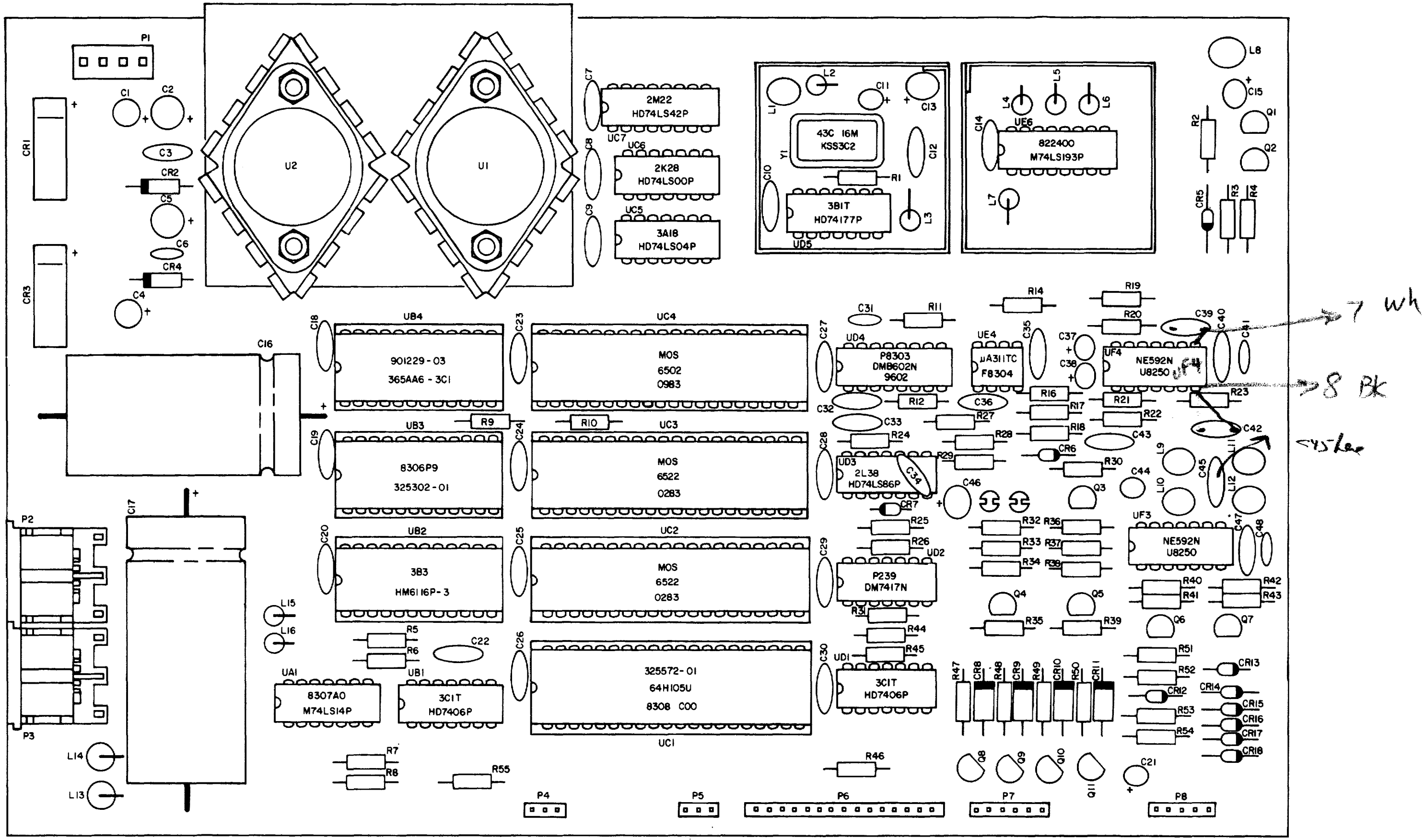


Figure 4-19. 1541 Disk Controller, Parts Layout

APPENDIX A

APPENDIX A

Fabrication of Video Detector

Materials Required:

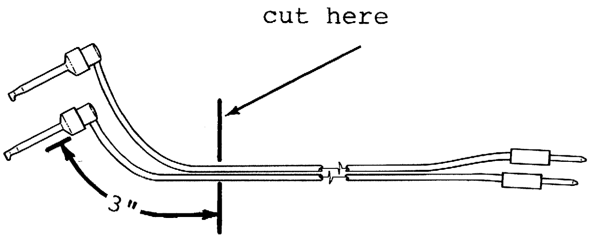
One set of meter leads	
One capacitor	.o1uF,50V
One resistor	1K,10%,1/4 W
One diode	1N4148 or equivalent

Equipment and Supplies:

Knife
Soldering iron
Wire cutters
Needle nose pliers
Heat shrink tubing, 1/2 inch
Heat shrink tubing, 3/16 inch
Solder, 60/40 resin core
Scale (ruler)
Ohmmeter
String or two wire ties

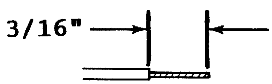
Preparation:

1. Cut meter leads as shown below:

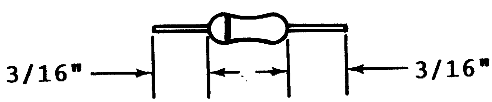


NOTE

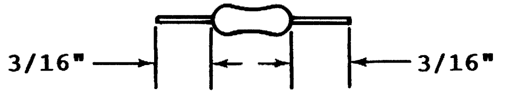
Strip off insulation 3/16" from both sides of cut.



2. Prepare diode as shown below:



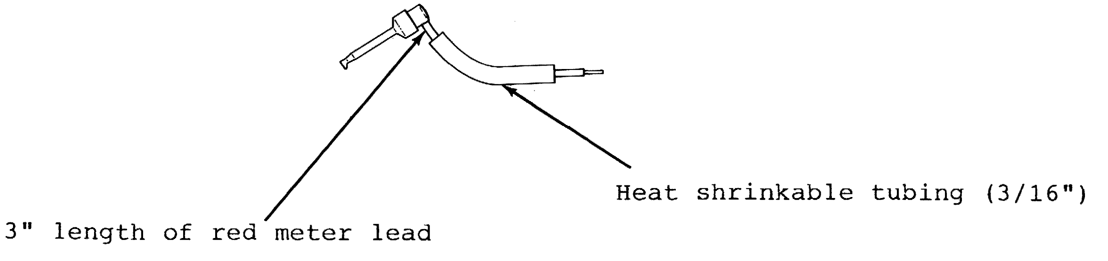
3. Prepare resistor as shown below:



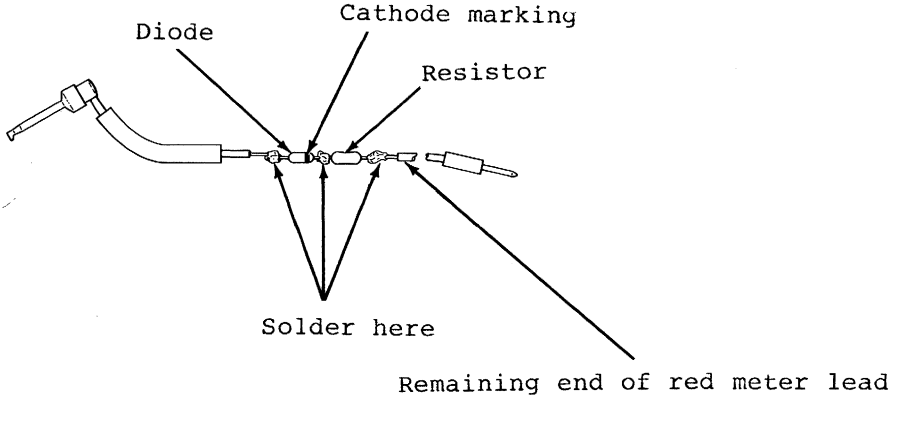
4. Tin all leads on resistor, diode and meter leads

Assembly:

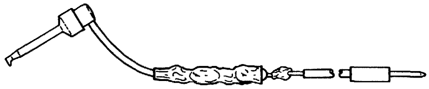
1. Slide 1 1/2 inch length of 1/8 inch heat shrink tubing onto red meter lead as shown below. Do not shrink the tubing at this time.



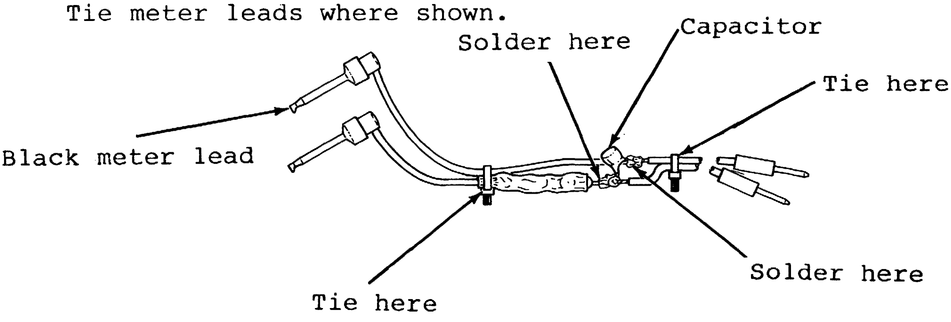
2. Solder diode, resistor and remaining end of meter lead together as shown below. Note proper polarity of diode.



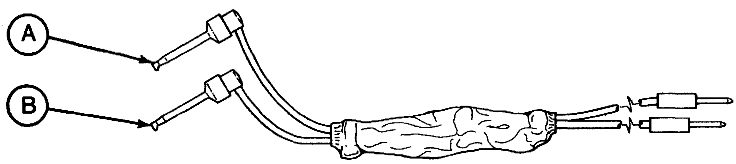
3. Slide heat shrink tubing over diode and resistor, leaving one lead of resistor exposed, and then shrink the tubing.



4. Solder capacitor and black meter leads as shown below. Tie meter leads where shown.



5. Slide a 2 inch length of 1/2 inch heat shrink tubing over capacitor and then shrink the tubing.



CAUTION

- USING OHMMETER, VERIFY RESISTANCE BETWEEN POINTS A AND B IS INFINITY.

APPENDIX B

APPENDIX B

Fabrication of Timing Light

Materials Required:

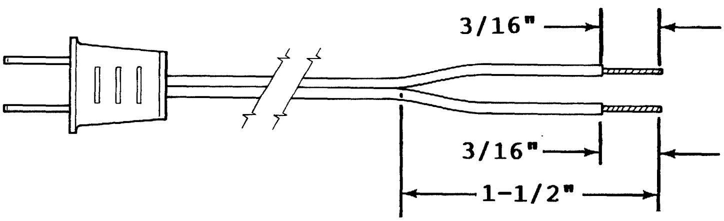
One neon bulb
One lamp cord with appropriate plug
One resistor 22K,10%,1/4 W (for 115 VAC)
47K,10%,1/4 W (for 220 VAC)

Equipment and Supplies:

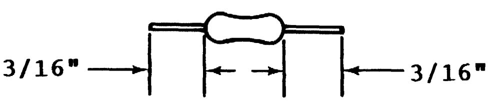
Knife
Soldering iron
Wire cutters
Needle nose pliers
Heat shrink tubing, 1/8 inch
Heat shrink tubing, 3/16 inch
Solder, 60/40 resin core
Scale (ruler)
Ohmmeter

Preparation:

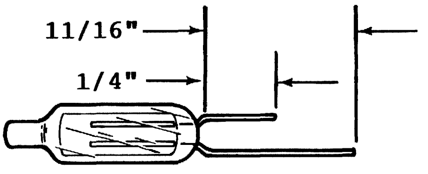
1. Prepare lamp cord as shown below:



2. Prepare resistor as shown below:



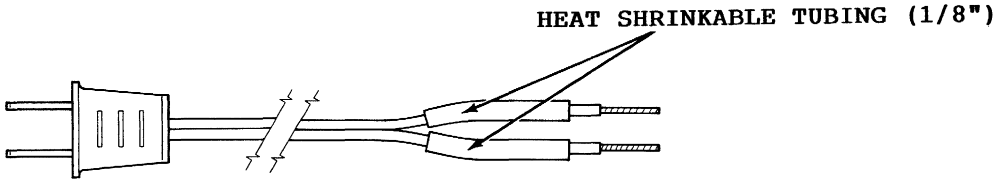
3. Prepare neon lamp as shown below:



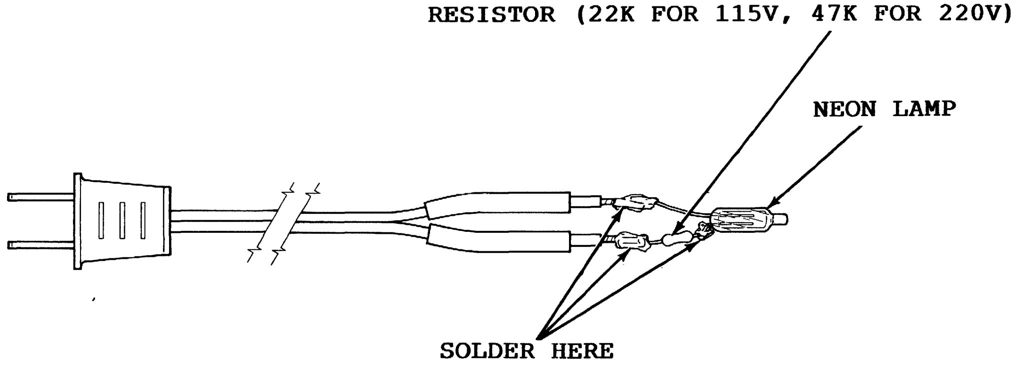
4. Tin all leads on lamp cord, resistor and neon lamp.

Assembly:

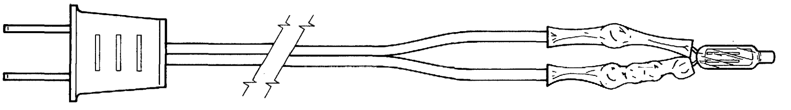
1. Slide 1 inch lengths of 1/8 inch heat shrink tubing onto each of the prepared leads of the lamp cord. Do not shrink the tubing at this time.



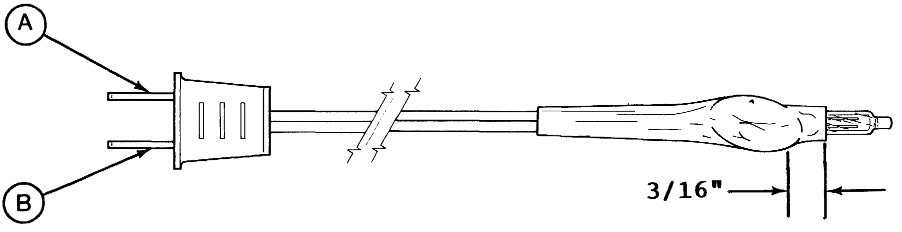
2. Solder components as shown below. Either lead of the line cord may be soldered to the resistor as long as the other lead is soldered to the neon lamp.



3. Slide both pieces of heat shrink tubing toward the base of the neon lamp and then shrink the tubing.



4. Slide a 2 inch length of 3/16 inch heat shrink tubing over neon lamp. Position the end of the heat shrink tubing 3/16 inch up from the base of the neon lamp and then shrink the tubing.



WARNING

- BEFORE PLUGGING IN TIMING LIGHT, USE OHMMETER TO VERIFY RESISTANCE BETWEEN POINTS A AND B IS INFINITY.

About the Author

Mr. Peltier has nine years professional experience in electronics, technical writing, and circuit and software design. Among his works are:


Michael G. Peltier

- 1541 Single Drive Floppy Disk Maintenance Manual
- 1541 Programmers Reference Card
- 1541 Heat Dissipating Kit
- DAS-1541 (Head Alignment Kit for 1540/1541)

About the Maintenance Guide

By public request the author has compiled this maintenance guide. This guide contains the following excerpts from the "1541 Single Drive Floppy Disk Maintenance Manual":

- Calibration (including head alignment)
- Troubleshooting Part I (for the novice)
- Schematics and Parts Layout (reference data for those with experience)

For additional information including; Theory of Operation, Advanced Troubleshooting and more, see the "1541 Single Drive Floppy Disk Maintenance Manual" (198 pgs.-118 illus.)

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